DPM 154-1

Nitrogen Material Safety Data Sheet

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AIR PRODUCTS

EMERGENCY PHONE: 800—523-9374 IN PENNSYLVANIA: 800—322-9092	TRADE NAME AND SYNONYMS Nitrogen, LIN (Liquid only)	CHEMICAL NAME AND SYNONYMS Nitrogen CAS#7727-37-9
ISSUE DATE AND REVISIONS Issued: 13 April 1977 Rev: 4 April 1984	FORMULA N_2 MW: 28.01	CHEMICAL FAMILY Inert gas

HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Nitrogen is a simple asphyxiant and has no threshold limit value (TLV).

SYMPTOMS IF INGESTED, CONTACTED WITH SKIN, OR VAPOR INHALED
Nitrogen is odorless and nontoxic, but may produce suffocation by diluting the concentration of oxygen in air below levels necessary to support life. PERSONNEL, INCLUDING RESCUE WORKERS, SHOULD NOT ENTER AREAS WHERE THE OXYGEN CONCENTRATION IS BELOW 19%, UNLESS PROVIDED WITH A SELF-CONTAINED BREATHING APPARATUS OR AIRLINE RESPIRATOR. Exposure to oxygen-deficient atmospheres may produce dizziness, nausea, vomiting, loss of consciousness, and death. Death may result from errors in judgement, confusion, or loss of consciousness which prevents self-rescue. At low oxygen concentrations unconsciousness and death may occur in seconds without warning. Extensive tissue damage or burns can result from exposure to liquid nitrogen or cold nitrogen vapors.

TOXICOLOGICAL PROPERTIES
Nitrogen is a simple asphyxiant and constitutes 79% of the air we breathe. Nitrogen does not support life and may produce immediately hazardous atmospheres through the displacement of oxygen. Nitrogen under high pressure can produce narcosis even though oxygen sufficient for life is present.

RECOMMENDED FIRST AID TREATMENT
Persons suffering from lack of oxygen should be moved to areas with normal atmospheres. SELF-CONTAINED BREATHING APPARATUS MAY BE REQUIRED TO PREVENT ASPHYXIATION OF RESCUE WORKERS. Assisted respiration and supplemental oxygen should be given if the victim is not breathing. If cryogenic liquid or cold boil-off gas contacts a worker's skin or eyes, frozen tissues should be flooded or soaked with tepid water (105-115F; 41-46C). DO NOT USE HOT WATER. Cryogenic burns which result in blistering or deeper tissue freezing should be seen promptly by a physician.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	AUTO IGNITION TEMP	FLAMMABLE LIMITS	LEL	UEL
N/A	N/A	N/A	N/A	N/A

EXTINGUISHING MEDIA	ELECTRICAL CLASSIFICATION
N/A	GROUP N/A

SPECIAL FIRE FIGHTING PROCEDURES
N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS
N/A

PHYSICAL DATA

BOILING POINT (°F.)	FREEZING POINT (°F.)
@ 1 atm. -320.5F (-195.8C)	@ 1 atm -346.0F (-210.0C)
VAPOR PRESSURE (psia)	SOLUBILITY IN WATER
N/A	@ 68F (20C), 1 atm 1.52% by volume

VAPOR DENSITY (lb/cu ft)	SPECIFIC GRAVITY (AIR = 1)	LIQUID DENSITY (lb/cu ft)	SPECIFIC GRAVITY (H_2O = 1)
@ 68F (20C), 1 atm 0.07273	@ 68F (20C), 1 atm 0.967	@ boiling point, 1 atm 50.45	@ boiling point, 1 atm 0.808

APPEARANCE AND ODOR
Both liquid and gaseous nitrogen are colorless and odorless.

DISCLAIMER

Information contained in this data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.
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REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
Inert	UNSTABLE		
	STABLE	X	None

INCOMPATIBILITY (Materials to avoid)
None

HAZARDOUS DECOMPOSITION PRODUCTS
None

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	None

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Avoid contact of skin with liquid nitrogen or its cold boil-off gas. Flush liquid nitrogen spill with water to disperse. Ventilate enclosed areas to prevent formation of oxygen-deficient atmospheres caused by the evaporation of liquid nitrogen or the release of gaseous nitrogen.

WASTE DISPOSAL METHOD
Allow liquid nitrogen to evaporate in a well ventilated outdoor location remote from work areas. Vent nitrogen gas slowly to a well ventilated outdoor location remote from work areas. Do not attempt to dispose of residual nitrogen in compressed gas cylinders. Return cylinders to Air Products with residual pressure, the cylinder valve tightly closed and valve caps in place.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Use self-contained breathing apparatus in oxygen-deficient atmospheres. Caution! Respirators will not function. Use may result in asphyxiation.

VENTILATION	LOCAL EXHAUST	SPECIAL
Natural or mechanical where gas is present.	MECHANICAL (General)	OTHER Vents should be situated to avoid higher than normal concentration of nitrogen in work areas.

PROTECTIVE GLOVES
(LIN) Loose-fitting gloves of impermeable materials such as leather. Leather work gloves are recommended when handling compressed gas cylinders.

EYE PROTECTION
(LIN) Chemical goggles or safety glasses. Safety glasses are recommended when handling high-pressure cylinders.

OTHER PROTECTIVE EQUIPMENT
None

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
Nitrogen shipments must be in accordance with Department of Transportation (DOT) regulations using DOT "NON-FLAMMABLE GAS" label. Consult DOT regulations for details on the shipping of hazardous materials.

SPECIAL HANDLING RECOMMENDATIONS
Prevent contact of liquid nitrogen or cold boil-off gas with exposed skin. Prevent entrapment of liquid in closed systems. Use only in well ventilated areas. Compressed gas cylinders contain nitrogen at extremely high pressure and should be handled with care. Use a pressure-reducing regulator and pressure relief devices when connecting to lower pressure piping systems. Secure cylinders when in use. Never use direct flame to heat a compressed gas cylinder. Use a check valve to prevent back flow into storage container. Avoid dragging, rolling, or sliding cylinders, even for a short distance. Use a suitable hand truck. For additional handling recommendations on compressed gas cylinders, consult Compressed Gas Association Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS
Store liquid containers and cylinders in well ventilated areas. Keep cylinders away from sources of heat. Storage should not be in heavy traffic areas to prevent accidental knocking over or damage from passing or falling objects. Valve caps should remain on cylinders not connected for use. Segregate full and empty cylinders. Storage areas should be free of combustible material. Replace the cylinder cap when the cylinder is not in use. Avoid exposure to areas where salt or other corrosive chemicals are present. See Compressed Gas Association Pamphlet P-1 for additional storage recommendations.

SPECIAL PACKAGING RECOMMENDATIONS
Gaseous nitrogen containers meet DOT specifications or American Society of Mechanical Engineers (ASME) codes. Liquid nitrogen is stored in vacuum-insulated containers meeting DOT specifications or ASME codes.

OTHER RECOMMENDATIONS OR PRECAUTIONS
Liquid nitrogen is a cryogenic liquid. Materials of construction must be selected for compatibility with extremely low temperatures. Avoid use of carbon steel and other materials which become brittle at low temperatures. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder filled without the permission of the owner is a violation of Federal Law. If oxygen-deficient atmospheres are suspected or can occur, use oxygen monitoring equipment to test for oxygen deficient atmospheres.

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.